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THE RELATIONSHIP BETWEEN THE USE OF EXPERIENTIAL KNOWLEDGE IN PREDICTING MEANING AND READING ACHIEVEMENT OF FOURTH GRADE STUDENTS

by

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A THESIS

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The undersigned certify that they have read and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "The Relationship Between the Use of Experiential Knowledge in Predicting Meaning and Reading Achievement of Fourth Grade Students" submitted by Donald Ian Inglis in partial fulfilment of the requirements for the degree of Master of Education.

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ABSTRACT

The purpose of this study was to investigate children's use of experiential knowledge in responding to verbal and non-verbal tasks. The number of responses, correctness of responses, and the place of prediction (at various stages in the tasks) were analysed in their relationship to reading achievement.

The sample consisted of forty grade four children with an equal distribution over sex and high and low reading achievement level which was determined on the basis of their reading scores on the Gates-MacGinitie Reading Tests Primary C.

The Non-Verbal and Verbal Tests of Fluency were specially constructed for this study. The Non-Verbal Test of Fluency was designed to measure fluency, correctness of responses, and place of prediction in a print free situation and consisted of four pictures, each picture continuing a sequence of four episodes which gave increasing numbers of clues as to the identity of the picture. The Verbal Test of Fluency was designed to measure similar objectives in a print situation and consisted of four topics, each topic containing a sequence of four sentences which gave increasing numbers of clues as to the identity of the topic.

Correlations and analysis of variance were used in the statistical analysis of resulting data. This analysis revealed that high reading achievers score higher on both non-verbal and verbal fluency, correctness, and place of prediction than do low reading achievers. These differences reached levels of significance ($p > .05$) set for the study for non-verbal fluency, non-verbal and verbal correctness, and verbal place of prediction scores. What appears to distinguish high and low

reading achievers is not the number of responses they give, but the correctness of those responses in terms of the information in the material presented.

Both high and low reading achievers produced greater numbers of responses for non-verbal tasks than for verbal tasks.

I.Q. was found to have little relationship to fluency but was significantly related to correctness for the total group and was significantly related to place of prediction for the total group and for low reading achievers.

Girls scored higher than boys on all non-verbal and verbal tasks except place of prediction. These differences did not reach levels of significance.

It was also found that high reading achievers and fluent students were exposed to more reading related experiences than low reading achievers.

Results of this study point out the need for differentiating instruction for high and low readers in getting them to respond correctly in terms of the information they possess and the information given in printed passages.

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CHAPTER I

INTRODUCTION AND PROBLEM

Reading has been defined in many ways, but in most cases it is agreed that meaning must be one aspect of reading. Goodman (1970) says in order for reading to occur there must be some degree of meaning. Meaning itself has been examined in many ways and it is generally agreed that gaining meaning from print involves at least two factors: knowledge of language and the reader's experiential knowledge.

Knowledge of language consists of a person's awareness (which may be implicit) of orthography or the structure of words, semantics, and syntax. Semantic knowledge is partly determined by syntax and partly by experiential knowledge, which includes that non-linguistic information which the individual has acquired from his involvement in, or exposure to, life. Walpole (1941) stated that semantics provides three types of contextual clues. These were labeled as physical, psychological, and symbolic. Physical context refers to all things existing around a person in his physical environment. Psychological context refers to the way a person organizes his experiences with words and objects in his own individual way. Symbolic context refers to those words or symbols known by the individual. Walpole further states that symbolic, psychological, and physical contexts overlap. One cannot know a word without having thought about it. Thus, all symbols are parts of psychological context. All experience in the physical world has contributed to all the pyschological context a person has. Walpole's examination of semantics points to the importance of the reader acquiring experience in physical context, organizing the experience psychologically, and

using the experience in a symbolic situation.

Reading has been described by K.M. Goodman (1968) as a psycholinguistic process or guessing game. In this process meaning is predicted on the basis of orthographic, syntactic, and semantic cues. More experienced readers tend to use these available cues more successfully than the less experienced readers. Although Y. Goodman (1967) points out the close relationship between the use of syntactic and semantic information and the acquisition of meaning, this study will focus on the use of semantic information that is brought to the reading task in the form of the reader's experiential knowledge.

I. PURPOSE

In order to reconstruct meaning from a reading task, the reader must bring to that task his knowledge of language and his experiential knowledge. It is the purpose of this study to investigate to what extent readers of different achievement levels use their experiential information or knowledge to predict meaning from non-verbal and verbal situations in which increasing amounts of information are given. The use of experiential knowledge will be considered in terms of fluency, degree of correctness, and place of prediction.

II. DEFINITION OF TERMS

1. Meaning refers to the reconstruction of the author's thoughts so that the receiver acquires the same or similar ideas to what the author intended to convey in symbolic form.
2. Prediction of Meaning denotes the ability to guess what the author intended, or to draw conclusions on the basis of

information given at various points in pictorial and verbal tasks.

3. Non-Verbal Tasks are pictures which have been divided into four episodes, each of which is shown in order of increasing number of cues for purposes of identification. The final episode contains the complete picture.

4. Verbal Tasks consist of a series of four sentences. Each sentence has a single word deleted and is shown in order of increasing cues for purposes of identification of the central theme of the series of four sentences.

5. Fluency refers to the number of responses given during the administration of a non-verbal or verbal task.

6. Degree of Correctness refers to the number of responses that are semantically acceptable in the context of the four picture episodes, or four sentence series.

7. Correctness refers to the semantic acceptability of a response given to the information presented. For non-verbal tasks the acceptability will be determined in terms of whether the cues presented could be features of the object named. Subjects were questioned at the end of a task on the feasibility of responses about which the examiner was uncertain. For verbal tasks semantic acceptability was determined by the meaningful congruence of the word suggested with the information presented. When necessary a dictionary was consulted to check congruencies.

8. Place of Correct Prediction refers to the picture episode or sentence on which the student gave the correct response for the total task that was consistent with all later correct

responses.

9. High Reading Achiever* refers to a grade four student reading above the 4.0 level on the comprehension section of the Gates-MacGinitie Reading Tests (Primary C).

10. Low Reading Achiever* refers to a grade four student reading below the 4.0 level on the comprehension section of the Gates-MacGinitie Reading Tests (Primary C).

III. HYPOTHESES

Research Hypothesis I

High reading achievers at the grade four level will be more fluent on non-verbal and verbal tasks than low reading achievers at the same grade level.

Null Hypothesis

There is no significant difference between the number of responses given by high and low reading achievers on:

(a) non-verbal tasks

(b) verbal tasks

Research Hypothesis II

High reading achievers will produce more correct responses than low reading achievers on non-verbal and verbal tasks.

---

* Reading achievement scores were taken from the June 1973 scores recorded on student cumulative record cards when 4.0 was the mean expected score at that time.

Null Hypothesis

There is no significant difference between high and low reading achievers on the degree of correctness of their responses on:

(a) non-verbal tasks

(b) verbal tasks

Research Hypothesis III

High reading achievers will earlier predict the identity of a picture or the central point of a series of sentences than will low reading achievers.

Null Hypothesis

There will be no significant difference between high and low reading achievers on the place of correct prediction scores on:

(a) non-verbal tasks

(b) verbal tasks

Research Hypothesis IV

The fluency, correctness, and place of prediction on non-verbal and verbal tasks of grade four children are related to their I.Q. and chronological age.

Null Hypothesis

There is no significant correlation between:

(a) chronological age, fluency, correctness, and place of prediction on non-verbal tasks

(b) chronological age, fluency, correctness, and place of prediction on verbal tasks

(c) I.Q., fluency, correctness, and place of prediction on non-verbal tasks

(d) I.Q., fluency, correctness, and place of prediction on

verbal tasks.

Research Hypothesis V

Girls will score higher than boys on fluency, correctness, and place of prediction on non-verbal and verbal tasks.

Null Hypothesis

There is no significant difference between the scores of boys and girls on:

(a) fluency, correctness, and place of prediction on non-verbal tasks

(b) fluency, correctness, and place of prediction on verbal tasks.

IV. ASSUMPTIONS

It is assumed that the children's performance is indicative of their actual ability to perform on the tasks used in this study.

A second assumption is that the reading levels are reflective of the reading levels of grade four children within the Edmonton Public School System and are not randomly biased by any one of the schools used in the study.

It is also assumed that for both the non-verbal and verbal tasks the larger number of correct responses indicate larger degrees of background experience.

A final assumption is that the themes chosen for the non-verbal and verbal tasks are familiar to the sample used in the study.

V. LIMITATIONS

The following factors are recognized as limiting the

generalizability of the data collected in this study. Research has shown that readers use their knowledge of language and their experiential knowledge in understanding what they read. Because language is also experience, the influence of one on the other is difficult to separate. Even though an attempt is made to control the syntactic aspect of language through the use of non-verbal tasks and of basic sentence structures, some students may be more familiar with the sentence structures chosen than others. This would give them a better chance of getting meaning or at least of not being hindered more than the other subjects in reconstructing the author's meaning. However, the researcher's reading the sentences along with the children should minimize the syntactic as well as word recognition factors.

VI. SIGNIFICANCE OF THE STUDY

Information about the use of experiential knowledge by grade four children to get meaning from a reading situation could enable teachers to modify programs in such a way as to help students become better readers. Depending on the results, the teacher may vary procedures. If low reading achievers lack fluency then it is necessary to build sufficient story background. If low reading achievers are as fluent as high reading achievers but not as correct, then there is need to get them to make more effective use of the information given in reading tasks.

VIII. OVERVIEW OF THE STUDY

In Chapter II the writer will review the available literature which is considered pertinent to the present study in an attempt to

construct a framework in which to consider the present research.

Chapter III will outline the experimental design. Information on the sample, test construction, and test administration, will be presented.

The results of the study will be analyzed and explained in Chapter IV.

Chapter V will present the summary, conclusions, implications, and suggestions for further research.

CHAPTER II

The purpose of this chapter is to develop a definition of reading and to review some research on children's use of experiential knowledge in reading.

I. A DEFINITION OF READING

Reading has been defined in various ways by different authors. Wiener and Cromer (1967) believe that reading is a two stage process which moves from identification to comprehension. According to them, identification is the proper discrimination of graphic symbols and the ability to associate these symbols with the sounds commonly attributed to them. The assessment of identification is usually restricted to some measurement of what and how words are said.

While much research has been done in the area of word identification much less has been done in the area of comprehension. It appears easier to assess comprehension through asking the reader to paraphrase, abstract, answer questions, or criticize than to actually define what comprehension is. Wiener and Cromer (1967) state that comprehension "refers to the addition of some form of meaning associated with the identifications or discriminations, i.e., the words elicit shared associations, or consensual indicator responses to or about the referent, or a synonymous response (p. 638)."

Goodman (1968) defines reading as an interaction between the reader and written language, through which the reader attempts to reconstruct a message from the writer by actively bringing to bear on

the writing his knowledge of language, his past experience, and his language processing skills. Goodman maintains that three types of information are used simultaneously in the reading process to move from identification to comprehension. These are graphic, syntactic, and semantic information. This information is the basis of the reader's expectations and information is processed to develop, revise, or reject these expectations. Goodman (1970) has called this process of reading to confirm or deny predictions a psycholinguistic guessing game.

Some of Frank Smith's (1971) views concerning reading are similar to those of Goodman. He suggests that reading is information processing carried out through feature-analytic methods. These methods are letter and word identification followed by comprehension of meaning. These tasks are usually performed separately by the beginning reader but the experienced reader is able to perform these tasks both simultaneously or separately. Smith maintains that through experience readers develop visual, acoustic, and semantic feature lists in their memory systems. Reading may then be considered a two stage process of reducing uncertainty by reconstructing what the reader sees in print through the use of feature lists in the memory systems. Smith states that the more skilled a reader is in using past information, the less visual information he needs from the page because he is able to predict what the unread material will be. The skilled reader has learned how to use syntactic and semantic redundancy and if the topic is familiar to him he merely samples visual information to confirm his expectations.

The thesis of this study may be interpreted against a framework of reading in which there is identification and comprehension. The focus of this study is on the latter aspect of reading, and for the

understanding of which the role of prior knowledge including language and meaningful experience must be considered.

II. EXPERIENTIAL KNOWLEDGE AND READING

Writing in the 1930's, John Dewey stated that amid all uncertainties there is one permanent frame of reference. That is the organic connection between education and personal experience. He maintains that wholly independent of desire or intent every experience lives on in further experiences. Much research examines the effects of the child's experience as a factor in determining his school achievement (Dave, 1963; Wolf, 1963; Vernon, 1965). Although innate capacity may be the most powerful single influence on achievement level, there is evidence that extreme deprivation of experience leads to progressive deterioration in academic ability (Douglas, 1964).

In 1883 Sir Francis Galton became one of the first researchers to attempt to determine the effects of experiences provided by the environment on the development of twins. He observed fraternal and identical twins in an effort to estimate the effects of differences in heredity and environment on men and women and concluded that heredity was a factor strongly independent of environment.

Others have also examined the effects of experience on achievement through the comparison of identical twins reared in the same and different environments. Bloom (1964) summarizes several studies on the scholastic achievement of twins, siblings, and unrelated children reared together and apart. His findings support the contention that experience provided by the environment has a powerful effect on the educational achievement of children. He concluded that children of

similar hereditary make-up perform similarly given the same experiences and differently given different experiences.

The area of school achievement on which this study focusses is reading. How well the student reads is influenced to some degree by the experiential background he brings to the classroom.

In 1957 Taylor developed the cloze technique as a measure of readability and later as a measure of reading comprehension. Basically this technique consists of the omission of every nth word (for example every fifth word) or specified words in a passage and the reader is asked to insert a word in the blanks. Through the use of this technique Taylor (1957) looked at the differences experience can cause in the responses of a population. He says the extent to which a population proposes similar words for any particular blank on the cloze procedure, depends on the relative similarity of the group and the invariability, definitiveness, and familiarity of the information presented. He feels that even if subjects perceive the stimulus in the same way, different habit systems may result in different response hierarchies. Taylor concluded that present response situations borrow from similar past situations. Unfamiliarity of a stimulus contributes to differences. This lack of familiarity or definiteness inclines a subject to random behavior. Consequently Taylor believes that essentially equivalent subjects can vary widely in words they propose on the cloze procedure because of these differences in experience. Deighton's (1959) work confirms the views held by Taylor. He maintains that the extent to which context reveals meaning varies with the experience of the reader.

The degree and nature of experiences to which individuals are

exposed are dependent on a number of factors. Sex differences, for example, which have received much research attention, may be determined by cultural experience. Although many (Hughes, 1953, Traler and Spaulding, 1954) North American studies show girls to be superior to boys at reading tasks in the early grades, Preston (1962) found the reverse to be true with German children.

Socio-economic status has been shown to be highly related to various reading skills. Hill and Giammatteo (1963) found grade three children of high socio-economic status performing well above low socio-economic status children in reading vocabulary and comprehension. Other studies have found relationships between reading disability and socio-economic disadvantage.

The results of a study by Sheldon and Carrillo (1952) indicate that student attitudes toward learning influenced their reading performance and these attitudes appeared to be formed in the home. According to Stauffer (1967), children bring many opinions and concepts which are obtained from previous experience that can be used in reading. Wilson (1948) maintained that many textbooks are difficult for students with limited experiential backgrounds because not enough detail was provided to properly amplify general and abstract statements included in the books. In her study with grade six and seven students she concluded that amplification of reading material is advantageous to comprehension. Strickland (1962) analyzed four basal reader series to compare the language used in the series with the language commonly experienced by grades one to six students, and found a great deal of variance.

Ruddell (1963) set out to investigate the effect of varying degrees of similarity of oral and written patterns of language structure

on the reading comprehension of 131 grade four students selected from the same schools Strickland (1962) had used. Ruddell used six cloze tests, three of which were based on high frequency oral language patterns and three based on low frequency patterns. These patterns had been previously identified by Strickland (1962). Ruddell's findings revealed significant differences in reading comprehension for reading passages that used high and low frequency oral language patterns with high frequency oral patterns being understood better in a reading situation. Ruddell concluded that reading comprehension is a function of the similarity of oral patterns of language structure to written patterns of language used in reading material and that reading comprehension scores are significantly greater when reading materials are used that utilize high frequency patterns of oral language structure and which, of course, are used more frequently in the child's experiential background.

In a later study, Tatham (1968) found similar results using 300 grades 2 and 4 children as subjects.

It is Wiener's and Cromer's belief that comprehension can take place provided that the reader already has language skills similar in complexity to what he reads. They also point out that many readers are able to perfectly "say" a word yet have no comprehension because they have no experience to which they can relate the word.

III. FLUENCY

When confronted with a task designed to envoke experience, one indicator of the degree of experience is the fluency of the subjects' responses. In what may be termed a pioneer study in this area,

Thurstone and Thurstone (1941) conducted a factorial study of intelligence. High school students comprised the study sample. This study revealed nine primary mental abilities of which word fluency was one of the most clearly identifiable and was defined as the ability to handle simple isolated words without regard for meaning. This factor was identified through tests using anagrams, disarranged words, first and last letters, spelling, and grammar. A number of other studies support Thurstone's claim for a word fluency factor. Carroll (1941) used Thurstone's factorial procedure with college students and also identified factors which he called richness of linguistic response, word fluency or speed of association for common words where there is a high degree of restriction as to appropriate responses, and verbal comprehension.

In a factor analysis of 28 cognitive tests including a cloze test, Weinfeld (1959) found the cloze test results highly correlated to a number of cognitive factors. His "indices of association" between each factor and the cloze test were: Verbal Factor .70, Fluency of Expression .54, Word Fluency .50, Ideational Fluency .40.

Another study using high school students was carried out by Jenkinson (1957). Cloze tests were administered to 210 subjects and the eleven subjects who received the highest scores and the eleven subjects who received the lowest scores on the cloze tests were selected for further interviews and testing where they were asked to verbalize their thoughts as they chose words to complete a selection of the cloze procedure. In examining the data from the high and low scorers Jenkinson found that high scorers recognized syntactical clues more frequently than low scorers. Only the low scorers made word recognition errors. In the "semantic category" or response which indicated the

manner in which meaning was obtained high scorers made more higher quality responses* and fewer low quality responses than low scorers (a response was a unitary idea). High scorers also made more use of context in anticipation of ideas and meaning and also checked meaning more by retrospection. High scorers were better able to fuse separate meanings of words or groups of words into ideas, reconstruct the sequence and interrelationship of ideas, and recognize implied meanings. Jenkinson also found that both high scorers and low scorers drew on their experience to assist comprehension but she found a difference in the quality of their replies. Verbalizations of the high scorers were more precise, relevant, and made more use of context than verbalizations of low scorers. Verbalizations of low scorers were more often vague, irrelevant and repetitious.

No studies were found which investigated the verbal fluency of elementary students.

VI. SUMMARY

Reading is a complex process that includes letter and word identification and comprehension. It is a process where the reader attempts to reconstruct the author's thoughts through the use of the visual cues presented and by applying his knowledge of language, and his past experiences.

Although much research has been done on the effects of experience on the general achievement of the learner, less research has been done on how experience influences success in reading. Verbal

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*cf definition of fluency in the study

fluency may be a primary mental ability which is indicative of the person's experience. The Cloze procedure appears to be a productive method of eliciting verbal fluency.

In conclusion, it seems that individual studies have, to varying extents, examined experience and reading achievement. However these studies have been either conducted with high school students and adults, or the results have been expressed in rather general terms. The present study investigates the degree of fluency and the correctness of the responses as evoked by non-verbal and verbal tasks as they related to reading achievement. In the following chapter, the design for such a study will be described.

CHAPTER III

THE EXPERIMENTAL DESIGN

This chapter describes the design, the selection of the sample, the test instruments used, and the procedures followed in the collection of the data. Statistical measures used to analyse the data are also indicated.

I. DESIGN OF THE STUDY

The basic problem this study attempted to examine was the use of experiential knowledge as an aid to the prediction of meaning during the reading process.

Two groups of high and low reading achievers were established and data on fluency, correctness of responses, and place of prediction for non-verbal and verbal tasks were gathered. Relationships and differences between the responses of the groups on the various tasks were determined by correlations and analysis of variance.

II. SAMPLE SELECTION

The sample for this study was chosen from the grade four classes of four middle class schools in the Edmonton Public School System. The selection of pupils for this study was made by means of stratified random sampling from the four schools selected by the Edmonton Public School Board. Equal numbers of girls and boys, and high and low readers for a total sample of forty, were chosen from eighty-seven grade four pupils attending these schools. The eighty-seven children selected for the study were divided into groups of high and low readers on the basis of their achievement on The Gates-MacGinitie

Reading Tests (Primary C, Form I). Since these tests were administered in June 1973, the mean expected reading score would be 4.0. This score was arbitrarily chosen by the writer as the dividing point for high and low readers. From above and below this mean two groups of ten girls and ten boys were selected. I.Q. scores (Lorge-Thorndike Intelligence Test) and chronological ages were obtained for this group from the cumulative record cards. Data on the sample are shown on Table I.

TABLE I

MEANS AND STANDARD DEVIATIONS FOR CHRONOLOGICAL AGE, I.Q. AND COMPREHENSION SCORES FOR THE SAMPLE

		Chronological Age	I.A.	Reading Score
TOTAL GROUP	$\bar{X}$	118.12	102.77	31.62
	SD	4.51	17.33	11.62
HIGH GROUP	$\bar{X}$	117.60	114.75	41.90
	SD	3.44	12.15	3.42
LOW GROUP	$\bar{X}$	118.65	90.80	21.35
	SD	5.43	12.94	6.58
BOYS	$\bar{X}$	118.45	104.25	31.80
	SD	5.08	17.98	12.94
GIRLS	$\bar{X}$	117.80	101.30	31.45
	SD	3.98	17.00	10.4.8

III. TEST INSTRUMENTS

Standardized Tests

The Gates-MacGinitie Reading Test (Primary C, Form I)

This test was chosen as a measure of reading achievement because it was a standard measure used throughout the Edmonton Public School System and scores were available from the student's cumulative record cards. Although this test allows for the measurement of reading vocabulary and comprehension ability, only comprehension scores, which were felt to be most pertinent to this study were used. The comprehension subtest, consists of very short paragraphs of increasing difficulty and students are instructed to choose appropriate words to fit several blanks in the paragraphs. According to Buros (1972) reliability coefficients for comprehension subtests exceed .82.

IV. TESTS CONSTRUCTED FOR THIS STUDY

Non-Verbal Test of Fluency

This test was designed to measure fluency based on experience in a written-language-free situation by utilizing four common objects. Eight objects were selected with which grade four students were familiar.

These were constructed in such a way that there were four episodes for each picture, with each episode giving additional cues as to the identity of the picture. On the basis of a pilot study the eight pictures were reduced to four plus a trial example. Some of the pictures were found to elicit noticeably fewer responses than others during the pilot study, as shown in Table II.

TABLE II

TOTAL RESPONSES ELICITED BY EIGHT NON-VERBAL TASKS
ON THE PILOT STUDY

	Objects Used in Non-Verbal Tasks							
Total Response	House	Car	Fish	Table	Flower	Chicken	Tree	Bicycle
Elicited	199	191	176	168	165	147	124	86

It was also found that for some pictures the subjects predicted the correct identity at too early a stage and consequently did not contribute any other responses beyond that stage. Furthermore when the teachers of the sample subjects expressed concern over how long their students would be out of classes it was decided to delete these apparently less productive objects from the study. The four most productive non-verbal tasks were retained plus one more as a trial example (See appendix A for a copy of the pictures). Each picture episode was presented on an 8 1/2" by 11" card with the following directions: (1) I am going to show you four picture clues, one at a time. A picture clue might be part of something you have seen. Each picture clue will give more information than the preceding one and I want to see if in the end, you can guess what the picture is. As I show you each picture clue, I want you to tell me all the possible things that it might be. You will have one minute to name all the things you can think of. Here is picture number one. (Response) From your answers do you know what the complete picture is going to be? (2) Here is picture number two. Tell me all the possible things this picture could be part of. You may use your

answers from number one if you think they fit here and add others if you wish. (Response) From your answers do you know what the complete picture is going to be? OR (if the student responded to the question after the first task regarding the identity of the complete picture) Will the complete picture still be _____? (3) Here is picture number three. What could this be part of? (Response) From your answers do you know what the complete picture is going to be? OR Will the picture still be _____? (4) Here is picture number four. What could this picture be? (Response) Do you know what the complete picture is? (5) Have you ever seen a _____ on TV or read a book about one?

Validity

The purpose of this test was to measure fluency based on experience in a written-language-free situation. Content validity is claimed for this test. The items chosen were considered to be common in the grade four student's environment. A further check was carried out to confirm the wide selection of items by asking each subject directly if he was familiar with it. Results indicated that the subjects had been exposed to all objects. The parts or episodes of each picture were presented with increasing numbers of cues in order to determine the ease of prediction. Prior to the pilot study and the main study each picture and its parts were submitted to graduate students and university faculty for their evaluations and comments.

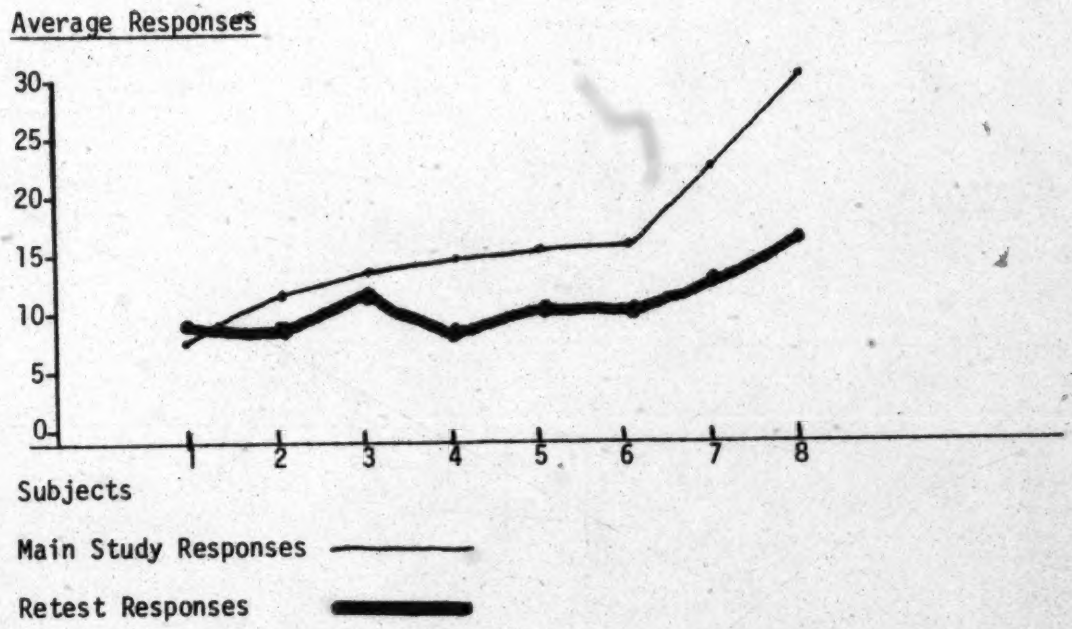
Reliability

In order to establish reliability the three non-verbal tasks

from the original eight that were not used in the main study were administered to eight of the sample subjects selected randomly. The same items from the main study could not be given as a retest because the subjects were required to predict the identity of the picture on the basis of increasing numbers of cues and on readministration would immediately know the identity of the picture. It was assumed that the three tasks administered in the retest were similar in design and subjects should be relatively consistent in the number of responses they produced. Results of the main study responses and retest responses are shown in Figure I and indicate that subjects were fairly consistent in their responses over those two time periods.

FIGURE I

AVERAGE RESPONSES OF EIGHT RANDOMLY SELECTED SUBJECTS ON A TEST RETEST SITUATION WITH NON-VERBAL TASKS



Verbal Test of Fluency

This test was designed to measure fluency based on students' experience in a modified reading situation. Eight topics judged familiar to grade four students were first chosen. They were hockey, snow, bees, a cat, a dog, a monkey, a beaver and a table of contents. Four sentences were written about each topic. The key item was omitted from each sentence and a blank space left. (This is actually a variation of the cloze technique). Four topics and a sample item were retained on the basis of pilot study findings (Table III) which showed some items more productive than others in terms of the number of responses elicited.

TABLE III

TOTAL RESPONSES ELICITED BY EIGHT VERBAL TASKS ON THE PILOT STUDY

	Topics Used in Verbal Tasks							
Total Response Elicited	Dog	Hockey	Bees	Beaver	Monkey	Cat	Snow	Table of Contents
	173	170	161	148	141	136	134	86

It was also found that some topics produced few correct predictions and these were eliminated. The topic about a monkey was eliminated because it may not have been a common experience for the subjects. (See Appendix B for the sentences used in the test). The verbal tasks were administered by uncovering one sentence at a time on an 8 1/2" X 11" card until all were visible with the following directions: (1) I am going to show you four sentences, one at a time. Each sentence has a

blank. Also each sentence will give more information than the preceding one and I want to see if in the end you can guess the word that fills all the blanks. As I show you each sentence I want you to tell me all the possible words that might go in the blank. You will have one minute to name all the things you can think of. Here is sentence number one which I will read with you. (Response) From your answers, do you know what the correct word is going to be? (2) Here is sentence number two. Tell me all the possible things that might now fit in the blank. You may use your responses from number one if you think they fit here and add others if you wish. (Reads sentence and waits) (Response) From your answers do you know what the correct word is going to be? OR (if the student responded to the question after the first sentence regarding the identity of the topic) Will the correct word still be _____? (3) Here is sentence number three. What could go in the blank? (Response) From your answers do you know what the correct word is going to be? OR Will the correct word still be _____? (4) Here is sentence number four. What could go in the blank? (Response) Do you know what the correct word is? (5) Have you ever seen or heard about a _____? Have you seen a _____ on TV or read a book about one?

It is important to note that the sentences for each topic were read with the students in an attempt to control for word recognition.

Validity

The writer also relied on content validity for this test. The experiences chosen as topics for the reading passages were considered common in the grade four pupil's environment. A further confirmation

of validity was carried out by directly asking each subject if he was familiar with the experience in question, after he had completed the tasks. Passages were read with the students so word recognition would not interfere with responses.

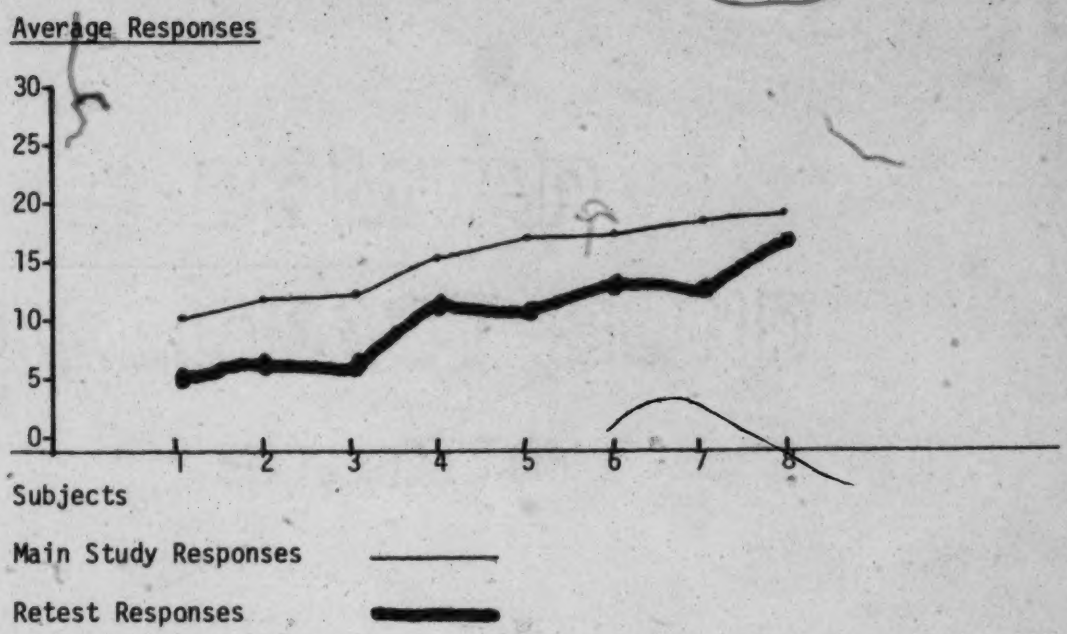
The sentences of each topic were presented with increasing numbers of cues in order to determine the ease of prediction. Prior to the pilot study and the main study each topic and its sentence parts were submitted to graduate students and university faculty for their evaluations and comments.

Reliability

In order to establish reliability the three verbal tasks not used in the main study were administered to eight subjects selected randomly as in the case of the non-verbal tasks. Items from the main study could not be given as a retest because subjects already knew the answers from their experience with the tasks in the main study. It was assumed that the three tasks administered in the retest were also similar in design to main study items and subjects should be relatively consistent in the number of responses they produced. Results of the two test administrations are shown in Figure II and as in the case of the non-verbal tasks indicate fairly consistent responding on the part of the subjects over both administrations.

FIGURE II

AVERAGE RESPONSES OF EIGHT RANDOMLY SELECTED SUBJECTS
ON A TEST RETEST SITUATION WITH VERBAL TASKS



V. QUESTIONNAIRE

Since experience was an important focus in this study a modified form of a questionnaire developed by Burt (1972) was administered to subjects to assess background experiences. This questionnaire consisted of thirteen questions which were administered orally in an attempt to identify the student's personal experiences, vicarious experiences other than reading activities, reading experiences, availability of books, and preferential use of time. It was hoped this information would provide descriptive data about the backgrounds of high and low readers. The questionnaire is reproduced in Appendix C.

VI. PILOT STUDY

A pilot study for the purpose of refining tests and administration procedures used in this project was conducted in an Edmonton Public School several weeks prior to the final collection of data. Ten grade four subjects were used. They were divided into high and low reading groups on the basis of their scores on the Gates-MacGinitie Reading Tests (Primary C).

The main reasons for conducting the pilot study were:

(a) to select the best test items from those devised, and refine them if necessary;

(b) to assess the time each presentation would take; and,

(c) to refine test administration.

As has been previously indicated some tasks were retained because they elicited more responses. Since testing was done on an individual basis and concern was expressed over students' absence from class, it was decided to limit the study to four non-verbal and four verbal tasks. Total testing time was approximately forty minutes for both the verbal and the non-verbal tasks.

VII. COLLECTION OF DATA

Each of the Non-Verbal and Verbal Tests of Fluency were administered individually by the researcher. After the subjects were made to feel at ease, directions were given and the sample item followed by the test items were administered. Student responses were tape recorded.

The Questionnaire developed by Burt (1972) on children's personal and vicarious experience was administered orally and in addition

to gathering information helped establish rapport before the initial testing stages. Other pertinent data such as Gates-MacGinitie reading score, I.Q. scores, chronological age, and sex were recorded by the researcher from the subject's cumulative records in their respective schools.

VIII. SCORING PROCEDURE

All the Non-Verbal and Verbal Fluency Tests were scored by the examiner.

(1) Fluency scores were attained by giving one point for each response given by the subject on both non-verbal and verbal tests.

(2) One point was also allocated to each correct response for both non-verbal and verbal tests.

(3) Place of prediction for both non-verbal and verbal tests was determined by directly asking the subject if he knew what the complete picture or correct word was going to be after each of the four episodes or parts of a task (verbal and non-verbal) was presented. A response had to be consistent with any previous responses on the task. A correct prediction made on the first part or episode was given one point while a correct prediction on parts two, three or four was given 2, 3, or 4 points respectively. This means that a low score was rated higher on place of prediction.

Scores for each task as well as average scores were computed.

IX. RELIABILITY OF SCORING

The reliability of the scoring was obtained by measuring inter-scorer agreement. A random sample of ten percent of the subjects' tests were rescored by a reading specialist. The scorer was provided with the tests, directions, tapes, and criteria for marking.

The Arrington Formula (1950) was used to compute the reliability score. The percentage of agreement was as follows:

(1) non-verbal fluency -- 99.1%

(2) verbal fluency -- 99.8%

(3) non-verbal correctness -- 98.2%

(4) verbal correctness --96.8%

(5) non-verbal place of prediction -- 100%

(6) verbal place of prediction -- 99.8%

These scores indicate satisfactory inter-scorer reliability.

X. SATISTICAL PROCEDURES

The data for this study were analyzed using the following analysis:

(1) Pearson Product Moment Correlation (DEST 02)

Using this test correlation matrices were computed for the variables age, I.Q., reading score, non-verbal fluency, verbal fluency, non-verbal correctness, verbal correctness, non-verbal place of prediction, and verbal place of prediction.

(2) One Way Analysis of Variance (ANOV 10)

This one-way analysis of variance was used to determine if the reading groups differed significantly on

non-verbal fluency, verbal fluency, non-verbal correctness, verbal correctness, non-verbal place of predictions and verbal place of prediction. Differences between the scores on these factors for boys and girls were also determined by this one-way analysis of variance program.

The findings of the study are presented in the following chapter.

CHAPTER IV

ANALYSIS OF DATA

The data obtained from testing forty grade four children at the end of the 1973-1974 school year in four schools from the Edmonton Public School System are presented in this chapter. The discussion and analysis of test results are presented under the following headings:

(1) Fluency on Non-Verbal and Verbal Tasks

(2) The Degree of Correctness of Responses

(3) Place of Correct Prediction

(4) Correlations of Related Variables

(5) Questionnaire Data

I. FLUENCY ON NON-VERBAL AND VERBAL TASKS

The subjects were divided according to their reading achievement into high and low reading groups. Table IV outlines the mean scores and standard deviations for these groups on non-verbal and verbal fluency tasks. (See Table IV on following page)

TABLE IV

MEANS AND STANDARD DEVIATIONS FOR FLUENCY SCORES ON NON-VERBAL AND VERBAL TASKS FOR HIGH AND LOW READERS

		Non-verbal Task Scores	Verbal Task Scores
TOTAL GROUP	$\bar{X}$	63.80	55.97
	SD	34.79	21.27
HIGH GROUP	$\bar{X}$	75.35	61.20
	SD	43.00	27.25
LOW GROUP	$\bar{X}$	52.25	50.75
	SD	18.83	11.37

The results indicate that the high readers scored higher on both non-verbal and verbal tasks than the low readers. The low readers appear more homogeneous than high readers when the standard deviation of their mean scores are examined. High readers tend to disperse over a wide range of scores. These results may be compared to a study done by Jenkinson (1957) who used high school students to examine selected processes and difficulties of reading comprehension. Jenkinson classified the responses of high and low scorers on "cloze" tests into three major aspects: structure, semantic, and approach. Findings showed that high and low readers differed on all aspects. More specifically on the approach category which included responses that suggest the method used by the individual in attacking reading, she stated that "there were many differences between the high and low group. The high

scorers revealed more ability to effect verbal closure and more verbal fluency and flexibility in manipulating the ideas gained from the passage than did the low scorers (p. 202)". Both groups made higher scores on non-verbal tasks than on verbal tasks. A possible explanation for the higher scores on non-verbal versus the verbal tasks might be due to the difference in mode of presentation of the two tasks. The non-verbal tasks were made up of a picture form of presentation. Even as preschoolers, children are familiar with this kind of task and consequently it may have been more conducive in evoking responses. The verbal tasks were presented in printed form. In general, the children would have only been familiar with written language tasks for approximately four years and consequently may not have been able to abstract information as readily as from the non-print tasks. Thus longer familiarity with non-print tasks may account for high scores on these tasks.

When an analysis of variance was computed on the differences between fluency scores (Table V) it was found that although the high readers had consistently scored higher than low readers on both non-verbal and verbal tasks these differences only reached significant levels for fluency scores on non-verbal tasks.

TABLE V

PROBABILITY OF DIFFERENCES BETWEEN HIGH AND LOW READERS ON FLUENCY SCORES

	Non-verbal Task Scores	Verbal Task Scores
Probability of Difference	.03	.12

Correlations calculated between the fluency scores on non-verbal and verbal tasks and reading achievement scores are shown in Table VI.

TABLE VI

CORRELATIONS BETWEEN READING AND FLUENCY SCORES ON NON-VERBAL AND VERBAL TASKS FOR HIGH AND LOW READERS

	Total Group	High Readers	Low Readers
Non-Verbal Task Scores	.31*	.002	.08
Verbal Task Scores	.20	.03	.07

* Significant at the .05 level

The correlation between fluency scores on non-verbal tasks and reading achievement reached the .05 level of significance for the total groups. Although the high group scored consistently higher on mean fluency scores (see Table IV), the correlation coefficients between reading and fluency scores within both groups were low and did not reach the level of significance. This may have resulted from some individuals in the high group scoring very low on fluency as well as a few individuals in the low group scoring very high in fluency, but particularly so in the high group where the spread of scores was very great.

Although there were few significant relationships between fluency scores, and reading achievement, Table VII reveals a high consistency between non-verbal and verbal fluency scores which were significant at the .01 level. This was especially true of the high

group who appeared to be either consistently high or consistently low in the amount of information they produced in response to non-verbal and verbal tasks.

TABLE VII

CORRELATIONS BETWEEN SCORES ON NON-VERBAL AND VERBAL FLUENCY TASKS FOR HIGH AND LOW READERS

	High Readers	Low Readers
Non-Verbal and Verbal Task Scores	.91**	.53**

** Significant at the .01 level

The consistency of high and low readers in fluency scores on non-verbal and verbal tasks would make it possible to predict one set of scores from the other since in both cases the correlations reached the .01 level of significance. The correlations coefficient of .91 indicates that 81% of the variance on both tasks is due to a common factor. Although this common factor could be experience or reading achievement, it might also be attributed to the mean I.Q. difference of twenty-four points between the two groups, (although I.Q. scores were not significantly related to fluency scores - Tables XVII and XVIII) or to a number of other factors.

II. THE DEGREE OF CORRECTNESS OF RESPONSES

Fluency does not necessarily mean correctness of responses given. For example one low reader read sentences indicating that something flew very well and hatched from eggs. She indicated that she thought it might be a bird. After reading the next sentence which added

information that the unknown lived together in large colonies or groups she responded that Hutterites live in colonies. After the task was completed the examiner asked the subject to re-read the sentences. She grudgingly admitted that Hutterites did not fly well or hatch from eggs, but she indicated that Hutterites was still the best answer. Apparently her associations between Hutterites and colonies was so strong it over-ruled the contradictory information she had received from previous sentences. Means and standard deviations for correctness scores on non-verbal and verbal tasks in Table VIII show that the responses from both groups of readers were more accurate for non-verbal tasks than for verbal tasks.

TABLE VIII

MEANS AND STANDARD DEVIATIONS FOR CORRECTNESS SCORES ON NON-VERBAL AND VERBAL TASKS FOR HIGH AND LOW READERS

		Non-Verbal	Verbal
TOTAL GROUP	$\bar{X}$	63.77	52.00
	SD	34.80	21.76
HIGH GROUP	$\bar{X}$	75.35	59.55
	SD	43.00	26.98
LOW GROUP	$\bar{X}$	52.20	44.45
	SD	18.86	11.16

Although both groups were highly correct on non-verbal tasks (See Table IV for total fluency scores the high group made fewer incorrect responses). This difference was more noticeable on the verbal tasks.

When classifying the responses of high school students to "cloze" tests Jenkinson (1957) identified a semantic aspect to the patterns by which cloze slots were completed. This semantic aspect included responses which indicated the manner in which meaning was obtained. Here Jenkinson (1957) found high scorers on "cloze" tests made more higher quality responses and fewer low quality ones than low scorers on "cloze" tests. High scorers on "cloze" tests were also found to check the correctness of their responses more often than low scorers on "cloze" tests.

Differences in the patterns of performance between tasks might be attributed to the nature of the task. In the picture tasks the information was superimposed in the sense that each part of the task presented the same picture with more information on it. Thus the non-verbal tasks made less demand on memory than the verbal tasks where information was added sequentially in sentences and must be held by the memory to give proper context to succeeding sentences. If this is the case then high readers probably had an advantage on the verbal tasks assuming they were better at other demands of the tasks like holding total information in memory. In a comment similar to the "Hutterite" response, one low reader observed that brownies lived in colonies on their meeting night but he either did not hold in his memory or apply previous information that the correct response could also fly and were hatched from eggs.

Whereas high and low readers differed on fluency on non-verbal tasks only, the differences between verbal and non-verbal correctness reached levels of significance ($p < .05$) as shown on Table IX.

TABLE IX

PROBABILITY OF DIFFERENCES BETWEEN HIGH AND LOW READERS FOR CORRECTNESS SCORES ON NON-VERBAL AND VERBAL TASKS

	Non-Verbal Correctness Scores	Verbal Correctness Scores
Probability of Difference	.03	.02

Since the groups did not differ significantly on fluency but they did on correctness it appears that the quality of a response is what is important and not the quantity. The low readers can be just as fluent as high readers but what the high readers say is more precise, exact, correct, and fits the context.

As in the case of fluency scores on non-verbal and verbal tasks the consistency between non-verbal and verbal correctness was (Table X) much higher (.89) for the high group than for the low group (.55). Both correlations however, are significant at the .01 level.

TABLE X

CORRELATIONS BETWEEN CORRECTNESS SCORES ON NON-VERBAL AND VERBAL TASKS FOR HIGH AND LOW READERS

	High Readers	Low Readers
Non-Verbal and Verbal Correctness Scores	.89**	.55**

** Significant at the .01 level

High readers tend to respond similarly to tasks (non-verbal and verbal) requiring them to focus in on information given in order to arrive at a solution. The consistency of their responses could be due to their

method in approaching such tasks.

III. PLACE OF CORRECT PREDICTION

Correctness on an individual task does not necessarily mean that subjects are aware of what the total picture or context is at the same point in time. Prediction or the correct identity of the picture or theme of the four-sentence-sequence could have taken place at either of the four steps in the presentation of the material. Earlier correct prediction was rated higher than later correct prediction. Since subjects were credited for the item number on which they made the first consistent correct prediction, lower mean scores on place of prediction were given to subjects who were able to predict the correct answer after fewer clues. Table XI records the average place of prediction for the four non-verbal tasks and the four verbal tasks.

TABLE XI

MEANS AND STANDARD DEVIATIONS FOR NON-VERBAL AND VERBAL AVERAGE PLACE OF PREDICTION SCORES FOR HIGH AND LOW READERS

Average Place of Prediction Scores

		Non-Verbal	Verbal
TOTAL GROUP	$\bar{X}$	3.78	3.86
	SD	.28	.36
HIGH GROUP	$\bar{X}$	3.75	3.70
	SD	.35	.34
LOW GROUP	$\bar{X}$	3.82	4.02
	SD	.20	.32

Lower mean average prediction scores by the high group on both kinds of tasks indicate they were able to predict the correct answer after fewer cues than could the low readers. An examination of individual tasks for the sample and with the resulting data shown on Tables XII, XIII, and XIV reveals that the pattern of the high group using fewer cues for prediction is more obvious.

TABLE XII

MEANS AND STANDARD DEVIATIONS FOR NON-VERBAL PLACE OF PREDICTION SCORES ON INDIVIDUAL TASKS FOR HIGH AND LOW READERS

	Non-Verbal Place of Prediction Scores			
	Task 1 (Table)	Task 2 (Car)	Task 3 (Fish)	Task 4 (House)
HIGH $\bar{X}$	3.35	3.80	3.70	3.85
GROUP SD	.59	.52	.47	.49
LOW $\bar{X}$	3.65	4.00	3.80	3.90
GROUP SD	.49	.00	.41	.31

The frequency of high and low readers on place of prediction reveals two significant points.

TABLE XIII

MEANS AND STANDARD DEVIATIONS ON VERBAL PLACE OF PREDICTION SCORES FOR INDIVIDUAL TASKS FOR HIGH AND LOW READERS

		Verbal Place of Prediction Scores			
		Task 1 (Cat)	Task 2 (Hockey)	Task 3 (Snow)	Task 4 (Bees)
HIGH GROUP	$\bar{X}$	3.80	3.50	3.70	3.90
	SD	.52	.83	.47	.31
LOW GROUP	$\bar{X}$	4.05	4.00	4.10	3.95
	SD	.39	.79	.45	.22

TABLE XIV

FREQUENCY OF HIGH AND LOW READERS ON PLACE OF PREDICTION FOR INDIVIDUAL ITEMS ON NON-VERBAL AND VERBAL TASKS

		Non-Verbal Tasks				Verbal Tasks			
		1	2	3	4	1	2	3	4
Task Items		Table	Car	Fish	House	Cat	Hockey	Snow	Bees
High Group	1								
	2	1	1		1	1	4		
	3	11		6	1	2	2	6	2
	4	8	19	14	18	17	14	14	18
No Correct Response	5	-		-	-	-		-	-
Low Group	1								
	2						2		
	3	6		4	2	1		1	1
	4	14	20	16	18	17	14	16	19
No Correct Response	5					2	4	3	

The first is the general pattern of high readers using fewer cues to make earlier predictions. The second is that high readers had more verbal tasks correct by the end of the tasks than did the low readers. These findings may also be related to Jenkinson's (1957) research which has been mentioned earlier in this study. Among the responses of her subjects she identified a semantic aspect of "cloze" slot completion which included responses which indicated the manner in which meaning was obtained. In examining these responses Jenkinson (1957) found that high scorers on "cloze" tests make more use of context in anticipation of ideas and meaning than low scorers on "cloze" tests. She also found that high scorers on "cloze" tests were better able to fuse separate meanings of words or groups of words into ideas, to reconstruct the sequence and interrelationship of ideas, and recognize implied meanings than low scorers on "cloze" tests.

An analysis of variance was computed to determine if scores on the place of prediction differed significantly for high and low readers. Results are shown in Table XV.

TABLE XV

PROBABILITIES OF DIFFERENCES BETWEEN HIGH AND LOW READERS ON NON-VERBAL AND VERBAL AVERAGE CORRECT PREDICTION SCORES

	Average Correct Prediction Scores	
	Non-Verbal	Verbal
Probability of Difference	.44	.004

Differences between the high and low readers only reached levels of significance for scores on verbal tasks. This may partly explain the

lower fluency on verbal tasks for high readers (see Section I of this chapter). Since they closed in on the answer more quickly on the verbal tasks than on the non-verbal tasks further responses would not be pertinent.

Correlations were calculated between the place of prediction scores on non-verbal and verbal tasks and the results are shown on Table XVI.

TABLE XVI

CORRELATIONS BETWEEN NON-VERBAL AND VERBAL AVERAGE PLACE OF PREDICTION SCORES FOR HIGH AND LOW READERS

	High Readers	Low Readers
Non-Verbal and Verbal Average Correct Prediction Scores	.26	.46*

* Significant at the .05 level

Relationships for non-verbal and verbal average place of prediction scores for high and low readers were significant only for low readers. Low readers usually scored late on prediction while high readers scored both early and late but generally scored early on prediction.

IV. CORRELATIONS OF RELATED VARIABLES

Because literature (Jenkinson, 1957; Fagan, 1969) has shown that I.Q., chronological age, and sex may be related to a person's performance in reading and related language factors including fluency the examiner also looked at these variables in this study. Information on the relationship between chronological age, I.Q. and fluency scores

on non-verbal tasks are found in Table XVII.

TABLE XVII

CORRELATIONS BETWEEN SCORES REPRESENTING EXPERIENTIAL KNOWLEDGE ON NON-VERBAL TASKS, CHRONOLOGICAL AGE, AND I.Q. FOR HIGH AND LOW READERS

		Fluency	Correctness	Place of Prediction
CHRONOLOGICAL AGE	--Total Group	-.004	-.004	-.12
	--High Group	.12	.12	-.17
	--Low Group	-.06	-.06	-.14
I.Q.	--Total Group	.19	.19	-.16
	--High Group	-.19	-.19	-.02
	--Low Group	.16	.17	-.26

None of the correlations between chronological age, I.Q. and fluency scores reached the levels of significance set for this study and it appears that intelligence scores and chronological age are not a factor in such scores.

Information on the relationships between chronological age, I.Q., and verbal fluency, correctness, and prediction for verbal tasks are found in Table XVIII.

TABLE XVIII

CORRELATIONS BETWEEN SCORES REPRESENTING EXPERIENTIAL KNOWLEDGE ON VERBAL TASKS, CHRONOLOGICAL AGE, AND I.Q. FOR HIGH AND LOW READERS

		Fluency	Correctness	Place of Prediction
CHRONOLOGICAL AGE	--Total Group	-.13	-.15	.21
	--High Group	-.02	-.001	.03
	--Low Group	-.28	-.36	.34**
I.Q.	--Total Group	.23	.33*	-.60**
	--High Group	.007	.02	-.17
	--Low Group	.27	.39	-.73**

**Significant at the .01 level *Significant at .05 level

The results of the correlations for verbal tasks are similar to those for non-verbal tasks. Among the differences that are found between the non-verbal and verbal tasks is that one of the relationships between chronological age and experiential knowledge and more specifically chronological age and place of prediction for low readers is significant. Perhaps the greatest difference is the significant relationship between I.Q., correctness, and place of prediction for the total group. The latter, place of prediction, was due largely to the performance of low readers and may also be related to a greater spread of I.Q. scores in the low group. Correlations also indicate that the place of prediction or quickness in closing in on the solution to a problem appears more dependent on I.Q. than do the other aspects of fluency investigated.

Since the sample contained equal numbers of boys and girls, the means and standard deviations of the two groups were compared for fluency, correctness, and place of prediction scores on non-verbal and verbal tasks. The means and standard deviations can be found in Table XIX and the probability of the differences between scores for the sexes may be found in Table XX (See Tables XIX and XX on following page).

TABLE XIX

MEANS AND STANDARD DEVIATIONS OF BOYS AND GIRLS ON FLUENCY, CORRECTNESS, AND PLACE OF PREDICTION SCORES FOR NON-VERBAL AND VERBAL TASKS

		Fluency		Correctness		Place of Prediction	
		NV	V	NV	V	NV	V
BOYS	$\bar{X}$	57.40	53.80	57.40	48.70	3.71	3.81
	SD	28.98	14.80	28.94	15.22	.28	.31
GIRLS	$\bar{X}$	70.20	58.15	70.15	55.30	3.85	3.90
	SD	39.94	26.46	39.54	26.79	.27	.40
TOTAL GROUP	$\bar{X}$	63.80	55.98	63.76	52.00	3.79	3.86
	SD	34.79	21.28	34.81	21.77	.28	.36

TABLE XX

PROBABILITY OF DIFFERENCES BETWEEN BOYS AND GIRLS ON FLUENCY, CORRECTNESS, AND PLACE OF PREDICTION SCORES FOR NON-VERBAL AND VERBAL TASKS

	Fluency		Correctness		Place of Prediction	
	NV	V	NV	V	NV	V
Probability of Difference	.25	.53	.25	.34	.12	.46

None of the differences between boys and girls on the various fluency tasks reached the level of significance set for the study. However, the girl's mean fluency scores and correctness scores were higher than those of the boys for both non-verbal and verbal tasks.

Fagan (1969) reported similar findings in a study which investigated the relationship between sentence transformations and reading comprehension for grade four, five, and six children. Girls achieved higher than boys at the .01 level of significance on their responses to "cloze" tests. Girls responded with a wider variety of grammatical forms in place of the original form on "cloze" tests. Fagan assumed that if the insertion of such words is indicative of an individual's flexibility with language structure then girls are more flexible in their use of language than are boys.

The boys received lower mean scores on place of prediction than girls did. These scores indicate that the boys identified the task at an earlier stage than the girls, or made correct predictions on the basis of fewer cues. A possible explanation for these findings might be that since the boys in this sample had a mean I.Q. that averaged slightly higher than the girls (104.25 for boys, 101.30 for girls) and I.Q. was significantly related to the place of prediction for the total group and for the low readers (see Table XIX).

V. QUESTIONNAIRE DATA

It appears that high and low readers both boys and girls tend to take part in many similar activities in their everyday life. A questionnaire developed by Burt (1972) was modified for the purpose of interviewing each subject about his personal experience. Results of the questionnaire are found in Table XXI. Although both high and low reading groups reported similar experience in kinds of travel, number

TABLE XXI

QUESTIONNAIRE DATA ON EXPERIENCE

		Male High Readers	Female High Readers	Male Low Readers	Female Low Readers
Average Number of Clubs belonged to		1.6	.4	1.0	.2
Average Number of trips of 5 types Edmonton, Alta., Canada, U.S.A., other		3.4	3.6	3.6	2.9
Number of locations lived in		1.5	1.7	1.5	1.6
TV watched by Gp %	None	0	0		
	0-3hrs.	50%	50%	70%	60%
	More	50%	50%	30%	40%
Books Read Per Week	None				
	Part	50%	20%	60%	70%
	One or More	50%	80%	40%	30%
Newspapers Read	None	30%	40%	40%	70%
	Once/week	50%	40%	30%	30%
	Every Day				
Books in House	0-49	10%	10%	10%	30%
	50-99	40%	60%	50%	50%
	100 or more	50%	30%	40%	20%
Own Books	0-9	30%	20%	50%	90%
	10-49	30%	60%	50%	10%
	50 or more	40%	20%		
Borrow Bks. From Library	None				
	1 or 2/mo.	30%	30%	20%	30%
	Every Wk.	70%	70%	80%	70%
Stories Read to before starting School		100%	100%	70%	80%
Learned to Read before Starting School		40%	40%	20%	10%

of locations lived in, and the rate at which books were borrowed from the library, some differences were apparent. High readers reported they engaged in more reading related experiences than did low readers. These experiences included watching more television, reading more books per week, reading the newspaper more, often having more books in their home, owning more books themselves, having been read to more often before starting school, and having more often learned to read before starting school. A further examination of the data on the basis of sex and reading achievement indicated that children are exposed to more similar experiences when compared on the basis of reading achievement, rather than a comparison by sex. It was noticed, however, that there appear to be greater discrepencies between the experiences of girls compared on the basis of reading achievement than boys compared on the basis of reading achievement.

In order to develop a different picture of the types of experiences to which children have been exposed, six children were selected for a more detailed analysis of the results of the questionnaire. Three of these children were chosen on the basis of high fluency scores and three on the basis of low fluency scores. Those who were high on fluency tended to be high in correctness and predicted meaning at an earlier stage. However, there was little consistency between fluency scores and I.Q. and reading achievement. The two groups of high and low fluent subjects did differ on certain experiential knowledge categories, particularly, T.V. watching, newspaper reading, books owned, borrowing books from the library, stories read to, and spare time activities. (See Table XXII)

TABLE XXII

A PROFILE OF THE THREE HIGHEST AND LOWEST FLUENT SUBJECTS IN THE STUDY

		Highly Fluent Group			Low Fluent Group		
		1.	2.	3.	1.	2.	3.
Fluency	NV	202	160	118	24	26	28
	V	154	90	74	39	38	32
Correctness	NV	202	160	118	24	26	28
	V	154	84	66	39	38	31
Average Prediction	NV	3.5	3.7	3.7	4.0	3.7	3.2
	V	3.7	3.2	3.7	4.0	3.7	4.0
Reading Achievement		41	45	38	27	39	44
Chronological Age		119	120	115	110	112	120
Sex		F	M	F	F	M	M
I.Q.		116	97	108	96	124	103
Clubs belonged to		2	3	---	---	2	2
Kinds of trips		3	3	5	2	4	4
Places lived in		2	2	2	3	2	2
TV watched per day		0-3 hrs.	0-3 hrs.	0-3 hrs.	over 3 hrs.	over 3 hrs.	0-3 hrs.
Movies Seen		Few	1/2/mo.	1-2/mo.	1-2/mo.	Few	Few
Books Read per week		1 or more	1 or more	1 or more	1 or more	1 or more	part of one
Newspaper read/week		1	7	---	---	1	---
Books in home		100 or more	50-99	50-99	0-44	100 or more	50-99
Books owned by Student		50 or more	10-49	10-49	0-9	0-9	0-9
Rate of Borrowing Books		Every Week	Every Week	Every Week	1-2/mo.	Every Week	1-2/mo.
Stories Read to Before School		Yes	Yes	Yes	No	Yes	No
Could Read Before School		No	A Little	No	No	No	No
Spare time activity		Reading	Reading & Math	Music	TV	Reports	Sports

VI. SUMMARY

High readers scored consistently higher than low readers on all aspects indicating experiential knowledge including fluency, correctness, and prediction. However, the differences were not always significant when analyzed by a one-way analysis of variance. Significant differences were found between high and low readers on fluency scores for non-verbal tasks, non-verbal and verbal correctness scores, and place of correct prediction scores on verbal tasks. The scores on the non-verbal tasks were generally higher, except high readers closed in more quickly on the identity of the verbal task.

Little relationship was found between I.Q., chronological age, and fluency, correctness, and place of prediction. It was found that girls were more fluent and correct in their responses than boys, but boys made correct predictions based on fewer cues than the girls.

Student reports on personal experiences revealed that although grade four students do have many similar experiences those experiences that are different may have an important relationship to reading achievement. The experiences that high readers were more often exposed to than low readers were the watching of more television, reading more books per week, reading the newspaper more, having more books in their home, owning more books themselves, having been read to more often before starting school, and having more often learned to read before starting school.

The following chapter will contain a summary of this study, discussion of the hypotheses, possible implications, and suggestions for further research.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

I. SUMMARY

The main purpose of this study was to investigate grade four readers ability to use experiential knowledge for the prediction of meaning on non-verbal and verbal tasks and its relationship to reading achievement.

The sample for the study consisted of forty grade four students who attended four of the Edmonton public Schools during the school year 1973 - 1974. Twenty had received a comprehension score above 4.0 on the Gates-MacGinitie Reading Tests (Primary C) administered throughout the system and twenty had received a comprehension score below 4.0 on the same test. The results for the Lorge-Thorndike Intelligence Test, along with the age in months, and sex of each subject were recorded for each subject. In addition, in order to gain further information about the students' background experiences, a modified form of a questionnaire. developed by Burt (1972) was administered in interview form.

A non-verbal test of fluency and a verbal test of fluency were designed specifically for use in this study and each test was administered in an individual situation. Responses were classified in terms of number of responses, correctness of responses, and place of prediction. All responses to these tests were recorded and analyzed using a one-way analysis of variance and correlations.

In addition selected data from the questionnaire and both fluency tests were subjected to further examination in order to gain

more information about the relationship of grade four readers' experiential knowledge to their reading achievement.

II. FINDINGS AND CONCLUSIONS

Hypothesis I

There is no significant difference between the number of responses given by high and low reading achievers on:

(a) non-verbal tasks

(b) verbal tasks

(a) This hypothesis was rejected since the analysis of variance indicated that high and low reading groups differed significantly on non-verbal fluency scores.

(b) This hypothesis was not rejected since the high and low reading groups did not differ significantly on their performance on verbal tasks.

Discussion

High reading achievers gave more responses on both the non-verbal and verbal tasks than did the low reading achievers. However, it was only on the non-verbal tasks that the difference between scores reached the level of significance set for this study ($p>.05$). Scores on non-verbal tasks were consistently higher than scores on verbal tasks. This could be due to the nature of the task since children from a very early age are accustomed to obtaining information from pictures whereas similar activity with print generally occurs at the time of starting school. In summary it appears that fluency (number of responses produced) is not a distinguishing factor of high and low readers.

Hypothesis II

There is no significant difference between high and low reading achievers on the degree of correctness of their responses on:

(a) non-verbal tasks

(b) verbal tasks

(a) This hypothesis was rejected since the analysis of variance indicated that high and low reading groups differed significantly on non-verbal correctness scores.

(b) This hypothesis was also rejected since the analysis of variance indicated that high and low reading groups differed significantly on correctness scores on verbal tasks.

Discussion

High reading achievers gave more correct responses on both non-verbal and verbal tasks than did low reading achievers. Differences between scores of both reader groups were more pronounced on verbal tasks than on non-verbal tasks. This might be due to the nature of the task since the non-verbal tasks were a series of pictures that superimposed increasing amounts of information on the same picture and thus made fewer demands on memory than the verbal tasks which required the information from previous sentences to be held in the memory to provide a proper context for succeeding sentences, and high reading achievers are usually better than low readers on memory ability. In summary it appears that correctness or the quality of the response is a distinguishing factor between high and low readers. High readers tended to be more cognizant of the information given and the responses they gave

were more precise, exact, correct, and more related to context.

Hypothesis III

There is no significant difference between high and low reading achievers on the place of correct prediction on:

(a) non-verbal tasks

(b) verbal tasks

(a) This hypothesis was not rejected since the high and low reading groups did not differ significantly on their place of correct prediction scores on non-verbal tasks.

(b) This hypothesis was rejected since the high and low reading groups differed beyond the .01 level of significance.

Discussion

High reading achievers made earlier correct predictions than did low reading achievers. However, it was only on the verbal tasks that the difference between scores reached the level of significance set for this study. The high reading achievers appeared to need fewer cues to predict the correct answer than low reading achievers and had more complete tasks correct at the end of the verbal tasks than did the low readers. The use of fewer cues to predict meaning by high reading achievers may partly explain lower fluency scores on verbal tasks by this group because this closure on the answer more quickly would make further responses irrelevant. In summary it appears that early correct prediction may be a distinguishing factor between high and low readers in that high readers need fewer cues to make correct predictions on verbal tasks.

Hypothesis IV

There is no significant correlation between:

(a) chronological age, fluency, correctness, and place of prediction on non-verbal tasks

(b) chronological age, fluency, correctness, and place of prediction on verbal tasks

(c) I.Q., fluency, correctness, and place of prediction on non-verbal tasks

(d) I.Q., fluency, correctness, and place of prediction on verbal tasks.

(a) This hypothesis was not rejected since all correlations between chronological age, fluency, correctness, and place of prediction on non-verbal tasks were non-significant.

(b) This was rejected only for chronological age and place of prediction for low readers where the relationship reached the .01 level of significance.

(c) This hypothesis was not rejected since all correlations between I.Q., fluency, correctness, and place of prediction on non-verbal tasks were non-significant.

(d) This hypothesis was rejected in part. Correlations reached levels of significance for I.Q. and correctness for the total group, I.Q. and place of prediction for the total group, and I.Q. and place of prediction for the low group. This hypothesis was not rejected for any other relationships.

Discussion

I.Q. and chronological age do not appear to be important factors affecting scores on non-verbal tasks. The same results appear true for the fluency score on verbal tasks. Chronological age was found to have a significant relationship to place of prediction on verbal tasks for low readers. I.Q. was significantly related to correctness and place of prediction for the total group as well as place of prediction for the low group on verbal tasks. In summary, the place of prediction appears to be more dependent on I.Q. than do the other aspects of fluency investigated.

Hypothesis V

There is no significant difference between the scores of boys and girls on:

(a) fluency, correctness, and place of prediction on non-verbal tasks

(b) fluency, correctness, and place of prediction on verbal tasks.

(a) This hypothesis was not rejected since boys and girls did not differ significantly on fluency, correctness, and place of prediction on non-verbal tasks.

(b) This hypothesis was not rejected since boys and girls did not differ significantly on fluency, correctness, and place of prediction on verbal tasks.

Discussion

The girls received higher fluency and correctness scores than the boys on both non-verbal and verbal tasks, however these differences did not reach levels of significance set for the study ($p > .05$). This

may be a result of girls maturing earlier in their use of language structures or vocabulary. However, boys were noted to use fewer cues to predict meaning earlier than girls. Although these differences did not reach the levels of significance set for the study ($p > .05$) these findings may be related to the higher mean I.Q. for the sample of boys, since I.Q. was found to be significantly related to place of prediction for the total group and for the low readers. In summary, although important differences were noted between boys and girls they did not reach levels of significance for this study.

III. LIMITATIONS OF THE STUDY

In addition to those limitations already outlined in Chapter I the following factors became apparent during the testing, which may tend to limit the applicability of the findings.

During actual testing, the testor noticed that a number of children examined the testing room for objects that could be used in the non-verbal and verbal tasks. Since the rooms were different in the different schools subjects did not have uniform cues from the environment in which they were tested.

IV. SUGGESTIONS FOR FURTHER RESEARCH

(1) A similar study might be conducted to see if the use children make of experiential information changes over various grade levels.

(2) A study might be conducted to see if cultural factors influence the degree to which children use experiential

information in reading.

(3) A study might be planned to see if different syntactic structures influence the degree to which children use information when reading for meaning.

(4) Since I.Q. did not relate to fluency but it did show some relationship to correctness and even a more significant relationship to place of prediction then there is need to study in more detail the role of I.Q. in the use of experiential information in the reading process.

(5) Since it appears that high reading achievers close in more quickly on meaning in a reading situation and that this is perhaps due to greater memory abilities which allows them to keep the total situation in mind, there is need to study in more detail the role of memory in the reading process.

(6) A study might be conducted to examine correctness of response in a more natural reading situation - that is, tasks similar to the four verbal tasks might be devised and embedded in text for the purpose of examining correctness of responses.

V. IMPLICATIONS

(1) The correctness of the responses rather than the number of responses appeared to be a dividing factor between high and low reading achievers. When children give answers to questions on meaning they should be

led to note consistent and inconsistent cues between the information given and their responses. This type of procedure should be much more effective in teaching children to use their information than the procedure of passing the question to the next student when the student asked does not know the answer which is often common practice in schools.

(2) Exercises like those used in this study may be easily devised and may be used to teach children, particularly low readers, how to use correctly the information they possess.

(3) Since memory may be an important factor in correctness, exercises could be devised where children read passages, list cue words, and summarize the passages orally or in writing. They could then compare their summaries to the original passage for correctness. This kind of exercise would be directed at improving both memory and the selection of the most important ideas.

(4) A greater number and more exposure to print oriented experiences seemed characteristic of high readers as compared to low readers. This would indicate that especially low readers should be encouraged to take part in reading related activities. More use could also be made of information obtained from media like newspapers, magazines, and television in classroom teaching.

(5) A wide variety of interesting reading material should

be made available in the classroom or in the library. Sufficient variation in reading level should be made in this material so low reading achievers can be encouraged and motivated to become as involved as the high readers.

VI. CONCLUDING STATEMENT

Findings in this study indicate that fluency or number of responses does not necessarily indicate high reading ability. It appears that the quality of responses and ability to hold contextual clues in the memory for use in predicting meaning is more important in distinguishing high and low readers. Experience with reading oriented situations also appears to have an important influence on the success of readers in using their experiential knowledge in verbal and non-verbal situations.

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APPENDICES

APPENDIX A

NON-VERBAL TEST OF FLUENCY

DIRECTIONS FOR THE NON-VERBAL TEST OF FLUENCY

1. I am going to show you four picture clues, one at a time. A picture clue might be part of something you have seen. Each picture clue will give more information than the preceding one and I want to see if in the end you can guess what the picture is. As I show you each picture clue, I want you to tell me all the possible things that it might be. You will have one minute to name all the things you can think of. Here is picture number one. (RESPONSE) From your answers do you know what the complete picture is going to be?

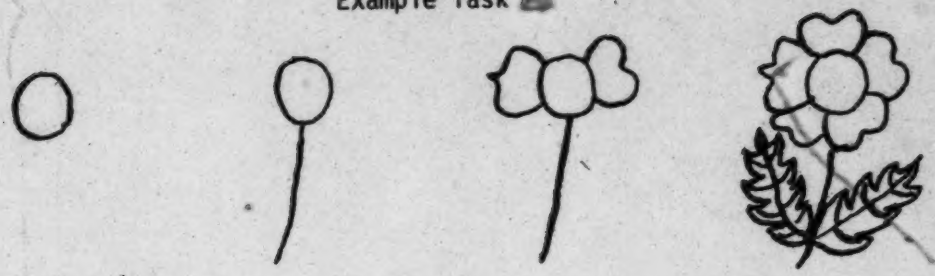
2. Here is picture number two. Tell me all the possible things this picture could be part of. You may use your answers from number one if you think they fit here and add others if you wish. (RESPONSE) From your answers do you know what the complete picture is going to be? OR Will the complete picture still be _____?

3. Here is picture number three. What could this picture be part of? (RESPONSE) From your answers do you know what the complete picture is going to be? OR Will the complete picture still be _____?

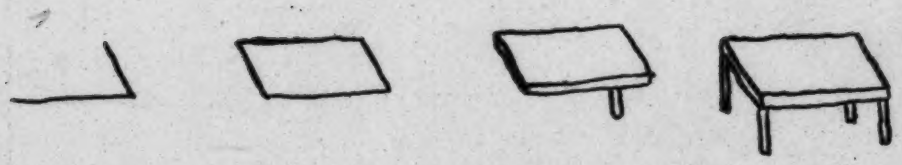
4. Here is picture number four. What could this picture be? (RESPONSE) Do you know what the complete picture is?

5. Have you ever seen or heard about a _____?
   Have you ever seen a _____ on TV or read a book about one?

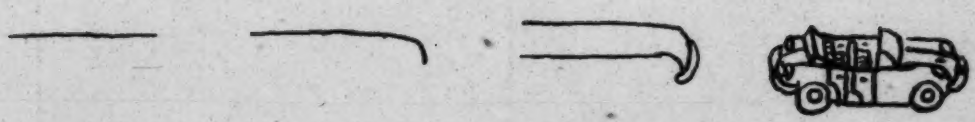
Example Task



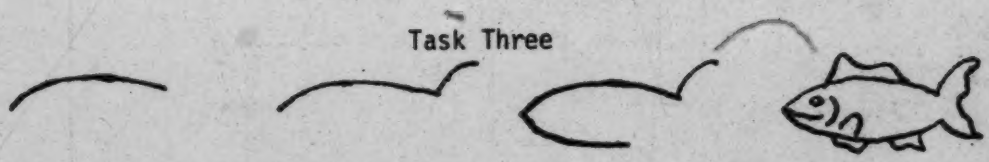
Task One



Task Two

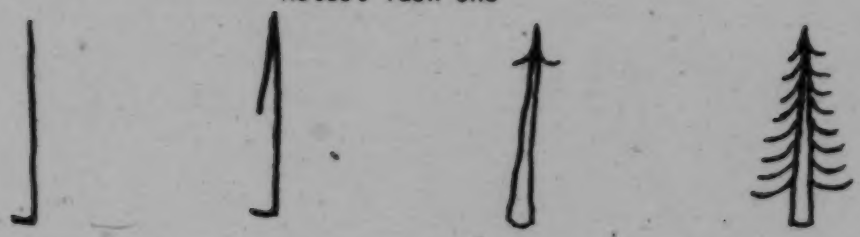


Task Three

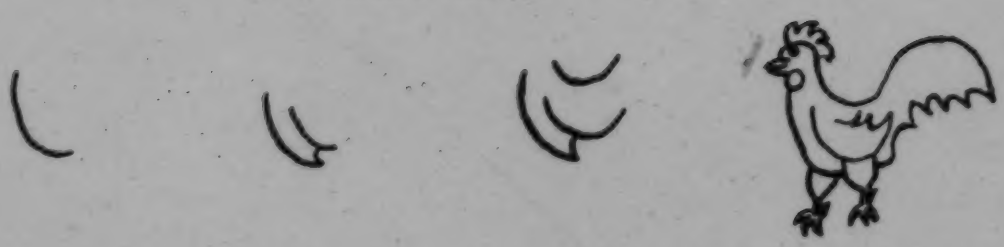


Task Four

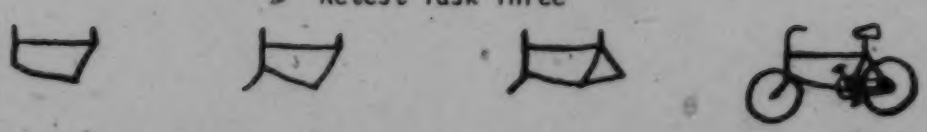
Retest Task One



Retest Task Two



Retest Task Three



APPENDIX B

VERBAL TEST OF FLUENCY

DIRECTIONS FOR THE VERBAL TEST OF FLUENCY

1. I am going to show you four sentences, one at a time. Each sentence has a blank. Also, each sentence will give more information than the preceding one and I want to see if in the end you can guess the word that fills all the blanks. As I show you each sentence I want you to tell me all the possible words that might go in the blank. You will have one minute to name all the things you can think of. Here is sentence number one. (RESPONSE) From your answers do you know what the correct word is going to be?

2. Here is sentence number two. Tell me all the possible things that might now fit in the blank. You may use your responses from number one if you think they fit here and add others if you wish. (RESPONSE) From your answers do you know what the correct word is going to be? OR Will the correct word still be_____?

3. Here is sentence number three. What could go in the blank? (RESPONSE) From your answers do you know what the correct word is going to be? OR Will the correct word still be_____?

4. Here is sentence number four. What could go in the blank? (RESPONSE) Do you know what the correct word is?

5. Have you ever seen or heard about a _____?
   Have you ever seen a _____ on TV or read a book about one?

VERBAL TEST OF FLUENCY

Example Task

The _____ has a long tail.

The _____ hunts by creeping silently up on its prey.

The _____ suddenly pounces on small animals.

The _____ loves to eat birds and mice.

Task One

_____ is an interesting game.

_____ is a very fast game.

_____ is played by two teams.

_____ is played by chasing a rubber puck on ice with sticks.

Task Two

_____ can be heavy or light.

_____ is usually cold.

_____ can be fun or it can cause trouble.

_____ can be used to build houses or snowmen.

Task Three

The _____ lives on a farm.

The _____ has many jobs to do.

The _____ takes the sheep to the pasture and guards them.

The _____ barks to warn his master if any wild animal approaches.

Task Four

_____ fly very well.

The young of _____ hatch from eggs.

_____ live together in large colonies or groups.

_____ are kept to produce honey.

Retest Task One

Some African boys found a _____.

The _____ ran in and out of houses.

The _____ could climb trees very quickly.

The _____ liked to eat bananas as it hung by its feet and long tail.

Retest Task Two

A _____ can be a great help to you when you are studying.

A _____ is found in most books.

A _____ contains the names of chapters and the pages on which they begin.

A _____ can usually give you some clues about a book.

Retest Task Three

The _____ has long sharp teeth.

The _____ has a warm dark brown coat of fur.

The _____ is an expert swimmer.

The _____ uses his teeth to cut down trees and then he builds dams of mud and sticks.

APPENDIX C

QUESTIONNAIRE ON EXPERIENCE

QUESTIONNAIRE

NAME _____ BOY _____ GIRL _____

School _____ Birthdate _____

Room or Class _____ Age _____

I would like to find out what Grade four students are interested in. In order to do this I am going to ask you some questions. This information will not be given to anyone else.

(1) Do you belong to any of these clubs?

Cubs _____ Brownies _____ The "Y" _____

Scouts _____ Girl Guides _____ Hockey Clubs _____

Baseball Clubs ___ Pioneer Girls _____ List Any Others _____

_____

(2) Have you been on any trips?

In Edmonton _____

In Alberta (but not Edmonton)_____

In Canada (but not Alberta) _____

U.S.A. _____

Outside North America _____

(3) Where have you lived?

In Edmonton _____

In Alberta (but not Edmonton) _____

In Canada (but not Alberta) _____

U.S.A. _____

Outside North America _____

(4) How much TV do you watch? -not at all _____

0 to 3 hours a day _____

more than 3 hours a day _____

(5) How many movies do you go to?-not at all _____

1 or 2 a month _____

3 or 4 a month _____

(6) What is the number of books you read each week?

-none _____

part of one _____

one or more _____

(7) Do you read a newspaper? -not at all _____

about once a week _____

every day _____

(8) About how many books are in your home?

0 - 9 _____ 50 - 99 _____ 100 or more _____

(9) About how many books belong to you?

0 - 9 _____ 10 - 49 _____ 50 or more _____

(10) Do you borrow books from any library?

not at all _____ once or twice a month _____ every week ___

(11) Were stories read to you before you started school?

no _____ yes _____ don't know _____

(12) Did you know how to read before you started school?

no _____ yes _____ don't know _____

(13) What one thing do you like to do best in your spare time?

Play sports	Watch T.V.	Any others?
Go to movies	Read	_____
Listen to radio	Listen to records	_____